



Near-surface wave velocity structure of Faial (Azores – Portugal) Island for site effect studies

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Throughout history, the life of the Azorean people has been marked by earthquakes that have had different effects depending on their proximity and magnitude. This seismic activity, which may have volcanic or tectonic origins, has affected the population of these islands by destroying infrastructure and claiming lives. The social and economic impacts of these phenomena are enormous. The last significant event affecting the Azores (Portugal) was the July 1998 $M_w=6.2$ earthquake causing major destruction affecting more than 5000 people, causing 8 deaths, 150 persons injured and 1500 homeless. Ground motion simulations are mainly based on source characteristics and are heavily dependent on the medium, which is still poorly understood. Subsurface soil condition can amplify the seismic waves, so, for seismic response analysis, it is necessary to know the shallow soil properties and its spatial variability. For this purpose, we applied P and S-wave refraction, Multichannel Analysis of Surface Waves (MASW) to characterize shear wave velocity at different sites in the Faial Island, in particular, in sites where already occurred amplification. Ambient vibrations can also be used to estimate physical properties of the shallower geological formations. With this goal, the obtained velocity models were confirmed by comparison between real H/V curves with synthetic ones. We concluded that the anomalous intensities observed in some sites are strongly related to thick layers of soft sediments of pyroclastic deposits produced by old volcanic eruptions occurred in the Faial Island.